Western Riverside County
Multiple Species Habitat Conservation Plan (MSHCP)
Biological Monitoring Program

Burrowing Owl (*Athene cunicularia*)
Survey Report 2006

April 23, 2007

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NOTE TO READER:

This report is an account of survey activities undertaken by the Biological Monitoring Program for the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). The MSHCP was permitted in June 2004. The Biological Monitoring Program monitors the distribution and status of the 146 covered species within the Conservation Area to provide information to Permittees, land managers, the public and the Wildlife Agencies (i.e., the California Department of Fish and Game and the U.S. Fish and Wildlife Service). Monitoring Program activities are guided by the MSHCP species objectives for each covered species, the information needs identified in MSHCP Section 5.3 or elsewhere in the document, and the information needs of the Permittees.

While we have made every effort to accurately represent our data and results, it should be recognized that our database is still under development. Any reader wishing to make further use of the information or data provided in this report should contact the Monitoring Program to ensure that they have access to the best available or most current data.

The primary preparer of this report was the 2006 Avian Field Crew Leader, Matt Talluto. If there are any questions about the information provided in this report, please contact the Monitoring Program Administrator. If you have questions about the MSHCP, please contact the Executive Director of the Western Riverside County Regional Conservation Authority. For further information on the MSHCP and the RCA, go to www.wrc-rca.org

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INTRODUCTION

The burrowing owl (*Athene cunicularia*; "BUOW") is a California species of special concern with specific habitat requirements and a relatively large home range. Although suitable habitat occurs throughout much of the Plan Area, burrowing owls are restricted to relatively few locations and are known from even fewer locations within the Conservation Area. The MSHCP identifies the following 5 areas as Core Areas for BUOW: 1. Lake Skinner/Diamond Valley Lake; 2. Playa West of Hemet; 3. San Jacinto Wildlife Area, Mystic Lake, and Lake Perris; 4. Lake Mathews, and 5. The Santa Ana River. The MSHCP species objectives for BUOW specify that 5 Core Areas should support a combined total of 120 breeding owls with no fewer than 5 pairs in any 1 Core Area (Dudek & Associates 2003).

In 2006, the Monitoring Program began a study to assess the distribution and abundance of breeding BUOW in the Conservation Area. Although previous surveys for BUOW have been conducted in the Planning Area by local biologists (e.g., Ginny Short, Pete Bloom, Jeff Kidd), no survey of the entire Conservation Area has been conducted in the same biological year or in a standardized manner. The primary goal of the survey in 2006 was to test a protocol to detect BUOW across the entire Conservation Area during a single breeding season using repeatable methods.

Survey Goals

A) Determine the distribution of burrowing owls within the Conservation Area
B) Test a protocol to provide an accurate, repeatable count of adult breeding burrowing owl pairs within the Conservation Area
C) Assess progress towards achieve the conservation goals in the species objectives (120 breeding owls with no fewer than 5 pairs in any one Core Area)

METHODS

Protocol Development

Our protocol was guided by *Comparison of Burrowing Owl Survey Methods* (Conway and Simon 2003) and *Burrowing Owl Survey Guidelines: Revised Burrowing Owl Survey Protocol for Southern California* (Pagel 2005). We conducted variable-radius point counts at designated locations in areas identified as suitable habitat. Survey points were 400m apart. Observers walked between point count stations. BUOW that were observed between point count stations (incidentally) were recorded. A copy of our protocol is included in Appendix A of this report.

Personnel and Training

All field personnel were trained in identification of BUOW and demonstrated proficiency at both visual and aural identification of BUOW. Supplemental training was provided by Ms. Ginny Short, a graduate student at the University of California at Riverside working on BUOW

dispersal. All personnel demonstrated competence with survey techniques before field surveys commenced. Personnel conducting BUOW surveys in 2006 included:

- Kimberly Oldehoeft, Project Lead (Regional Conservation Authority)
- Annie Bustamante (California Department of Fish and Game)
- Debbie De La Torre (Regional Conservation Authority)
- Christina Greutink (Regional Conservation Authority)
- Conan Guard (Regional Conservation Authority)
- Leslie Hanson (Regional Conservation Authority)
- Jason Hlebakos, Lead Biologist (Regional Conservation Authority)
- Kristen Hoogheem (Regional Conservation Authority)
- Iris Koski (Regional Conservation Authority)
- Chadette Pfaff (Regional Conservation Authority)
- Matt Reed (Regional Conservation Authority)
- Dan Williams (Regional Conservation Authority)

Study Site Selection

We surveyed a total of 3 Core Areas (San Jacinto Wildlife Area, Lake Mathews and the Lake Skinner/Diamond Valley Lake), as well as other areas with suitable BUOW habitat not identified as Core Areas (Figure 1). The portion of the Lake Skinner/Diamond Valley Lake Core Area on the north shore of Diamond Valley Lake and the Santa Ana River Core Area were not surveyed by the Biological Monitoring Program in 2006 because we could not obtain permission to access these areas. Surveys were not conducted in burrowing owl habitat in the Playa West of Hemet Core Area because land has not yet been conserved.

Point count locations were placed on a grid with points spaced 400m apart within potential suitable habitat in the Conservation Area. Suitable habitat was defined as grassland and agriculture using the updated GIS vegetation map (CDFG et al. 2005). The grid area included a total of 1,020 points and 19,042 hectares of BUOW habitat based on the vegetation map. Of the 1,020 points possible, 282 were excluded because of mapping errors or because we did not have permission to access the land (e.g. Santa Ana River, Prado Basin, Riverside County Flood Control, North Hills area of Diamond Valley Lake).

During the initial visit, points were evaluated for their suitability for surveys. Survey points were moved to a vantage point within 100m if necessary to provide a viewing station free from obstructions. Points were discarded if the habitat was clearly unsuitable for BUOW. Unsuitable habitat included heavy human disturbance (development, construction), surface water, and dense brush or grass providing complete canopy closure. Of the 738 points possible, 270 were excluded because habitat was deemed unsuitable for BUOW and 29 points were excluded due to environmental hazards (i.e., unexploded ordinance and contamination at Potrero). We completed surveys at 438 points out of the 738 available within the survey area.

Survey Methods

Survey methods used in 2006 are detailed in the *Western Riverside County MSHCP Surveying Protocol for the Burrowing Owl (Athene cunicularia) in Western Riverside County, Californi*a (Appendix A).

Surveys were divided into 2 phases. The first phase (distribution and occupancy) allowed us to quickly cover the suitable habitat within the Conservation Area and identify locations where BUOW occurred. It consisted of 3 replicates of variable-radius point counts. The second phase (breeding pair counts) occurred wherever 1 or more BUOW were detected, and consisted of an inventory (census) of all BUOW at locations where they were observed during the point counts. Additionally, any BUOW observed in the Conservation Area while traveling between survey points were recorded along with a GPS location; these incidental locations were also visited during the second phase of the survey. The second phase allowed for a more thorough enumeration of all BUOW present at occupied point locations. Inventories were conducted as soon as possible after BUOW were located during point counts.

Both point counts and inventories were conducted 3 times during the breeding season and were timed to correspond with the incubation, nestling growth and fledging phases of the BUOW nesting cycle. The 2006 survey periods were from 3 April to 2 June, 5 June to 14 July, and 17 July to 1 September. Surveys were conducted from 0.5 hours before dawn through 4 hours after dawn. Surveys were terminated when the temperature rose above 32.2 C, when wind speeds rose above 20 km/h, or if it began to rain.

The point count surveys lasted for 10 minutes. During the first 2 minutes, observers silently scanned the surrounding area for BUOW. A recorded BUOW call was then played for 30 seconds, followed by silent observation for 1 minute. The 1.5-min playback and observation period was repeated once in each cardinal direction. Observers made silent observations for the final 2 minutes of each survey. Azimuth and distance from the point count location were recorded for all BUOW observed during the 10-minute survey. Approximate age (adult or juvenile), and sex of observed individuals were also recorded.

Observers returned to locations where BUOW were observed during point counts or between survey stations to conduct inventories of the BUOW at each location. Two to 3 observers approached known BUOW locations while minimizing noise and visibility to prevent flushing BUOW from the site before the inventory was complete. The observers were situated a minimum of 50m from and surrounding the known BUOW location. A minimum of 30 minutes were spent counting BUOW and mapping BUOW locations. The inventory period concluded when all observers were confident that all observable BUOW had been detected. Observers then compared maps and produced a consensus count. If no consensus count could be reached, the inventory was repeated the following day. Inventories were repeated during each sampling period.

Data Analysis

Occupancy

We used the occupancy models in Program MARK (White and Burnham 1999) to determine occupancy and point-level detection probability for observed BUOW within the Conservation Area. Occupancy modeling (MacKenzie et al. 2002) is a technique that estimates the point-level detection probability – in this case, the probability that at least 1 BUOW would be observed at each point-count station during each of the 3 visits. The reciprocal of this value (1 – detection probability) is the probability that a BUOW would not be recorded during a 10-minute point count, even though it was actually there. This detection probability is then used to adjust the actual presence/absence data collected during field surveys, and therefore provide a more-accurate estimate of the true occupancy rate.

We created 2 *a priori* occupancy models to assess which best explained the patterns in the survey's presence-absence data: 1) where a separate detection probability was estimated separately for each of the 3 visits, and 2) where detection probability was assumed to be constant among the 3 visits. We used an information-theoretic approach (Burnham and Anderson 2002) and Akaike's information criterion adjusted for small sample sizes (AIC_c) to decide which of the two models best fit our field data. In this model-selection approach, it is the difference between the AIC_c values (ΔAIC_c) that is used to assess the strength of support for each model. In general, models whose ΔAIC_c's are within 2 units of the best-supported model are considered to be "well supported" and should be assessed as approximately equal in their ability to explain the data. ΔAIC_c's between 2 and 4 are considered to have some support, those between 4 and 7 have very limited support, and those > 7 basically are not supported (Burnham and Anderson 2002:70).

Breeding Pair Counts

Observed BUOW were classified as single adults, paired adults, or juveniles whenever possible. Burrowing Owls were considered to be an adult pair if 2 adults were observed from the same survey point, or if a single adult was observed with several juveniles or owls of unknown age. Multiple groups that were separated by more than 100m were counted as separate pairs. For the purposes of counting the number of unique pairs or individuals at a single point, the greatest number of owls observed on any single survey or inventory for that point was used as the number of owls at that point.

We also compared our BUOW locations from 2006 with locations observed in 2005 and 2006 by Ms. Ginny Short. Ms. Short has collected records of burrowing owls from a variety of sources and methodologies, across multiple years. We wanted to compare the results of our standardized survey to the cumulative information she had gathered.

RESULTS

Distribution and Occupancy

Of 438 points, 16 (3.7%) were occupied by BUOW. Figures 2 and 3 show the locations where we detected at least 1 BUOW.

The best-supported occupancy model indicated that point-level detection probabilities were constant among the 3 visits. The detection probability for a single visit was 0.26 (95% confidence interval = 0.12 to 0.47). The cumulative detection probability (after all 3 visits) was 0.59, meaning that we detected at least 1 BUOW nearly 59% of the time after three 10-minute point count surveys, **if** it was present at a given location. The overall occupancy rate estimate for the MSHCP Conservation Area (adjusted to correct for points that were occupied but where surveyors failed to detect BUOW) was 0.08 or 8% (95% confidence interval = 4% to 16%)

Breeding Pair Counts

We observed a total of 20 BUOW pairs. We observed 7 pairs at Johnson Ranch, 12 pairs at Lake Perris and the San Jacinto Wildlife Area, and a single pair at Warm Springs (Figures 2 and 3). We observed a total of 41 fledglings, including 23 at Lake Perris and the San Jacinto Wildlife Area, 2 at Warm Springs, and 16 at Johnson Ranch. A single unpaired adult was observed at Johnson Ranch, and another was detected at Warm Springs. Seven Burrowing Owls of unknown age were also detected on surveys.

The Monitoring Program's BUOW survey results were compared to a database of burrowing owl locations maintained by Ginny Short. Our data included 10 locations that were not in Ginny Short's database for 2005 and 2006. Conversely, Ms. Short's database listed 9 areas occupied by owls where no BUOW were detected by our surveys. Eight of these locations were in areas not surveyed by the Monitoring Program, including two locations in flood control channels near Warm Springs, one location in the north hills area of Diamond Valley Lake, and six locations around the eastern portion of the Prado Basin. One BUOW recorded by Ms. Short at Johnson Ranch was not detected during our surveys at the same location.

DISCUSSION

Our survey goals for the 2006 BUOW study were to test a protocol to detect BUOW across the entire Conservation Area during a single breeding season using repeatable methods, and to determine the distribution and number of adult breeding owls. We conducted a total of 438 point counts in 3 of 5 MSHCP specified Core Areas for BUOW and many other areas containing suitable habitat. At least 5 pairs of BUOW were detected in 2 of 3 Core Areas surveyed (12 pairs at San Jacinto Wildlife Area, and 7 pairs at the Lake Skinner/Diamond Valley Lake Core Areas). The Lake Skinner/Diamond Valley Lake Core Area includes the Johnson Ranch area. No owls were detected at the Lake Matthews Core Area. The Monitoring Program detected at least 40 breeding owls in the Conservation Area in 2006.

Using the point count method allowed us to cover all portions of the Conservation Area where access permission could be obtained. The cumulative detection probability of 0.6 obtained from this method indicates that after 3 visits, we detected BUOW approximately 60% of the time when they were present. This means that, assuming a constant individual detection probability of 0.26, 10 visits would be needed to have 95% confidence that owls are not present at a given survey location. Furthermore, the number of BUOW (pairs and individuals) within the Conservation Area is likely to be greater than the 2006 survey indicated. We detected owls at 3.7% of all surveyed locations (16 points), but the corrected occupancy estimate indicates that owls are present at a mean of 8% of survey locations (35 points).

Some of the BUOW habitat within the Conservation Area was not surveyed due to access constraints. Importantly, this includes 2 Core Areas (Santa Ana River and Playa West of Hemet), a portion of 1 Core Area (the hills north of Diamond Valley Lake), and a number of flood control channels where owls have been observed.

Our low detection probability and the lack of access to areas where BUOW are known or expected means that there are probably more owls to be found in the Conservation Area. Based on the 2006 survey results, an expanded survey effort as well as protocol modifications (including habitat-covariate analyses) should be implemented to more fully address the species objectives.

Recommendations for Future Surveys

We will incorporate the following measures into future BUOW surveys:

The survey area will be expanded to include areas not surveyed within the Conservation Area where BUOW are known or suspected to occur based on other survey results. These areas include the Santa Ana River and Prado Basin, several Riverside County Flood Control channels, and the North Hills area of Diamond Valley Lake.

Data on habitat covariates will be collected to more precisely model occupancy given specific habitat requirements of BUOWs. Predictive hypotheses about BUOW habitat requirements will be used as the basis for developing the habitat assessment. These hypotheses can then be tested in the models. The addition of covariates to the model may also increase individual detection probabilities such that 3 visits will be sufficient to detect owls with 95% confidence.

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Figure 1: 2006 Burrowing Owl Survey Locations

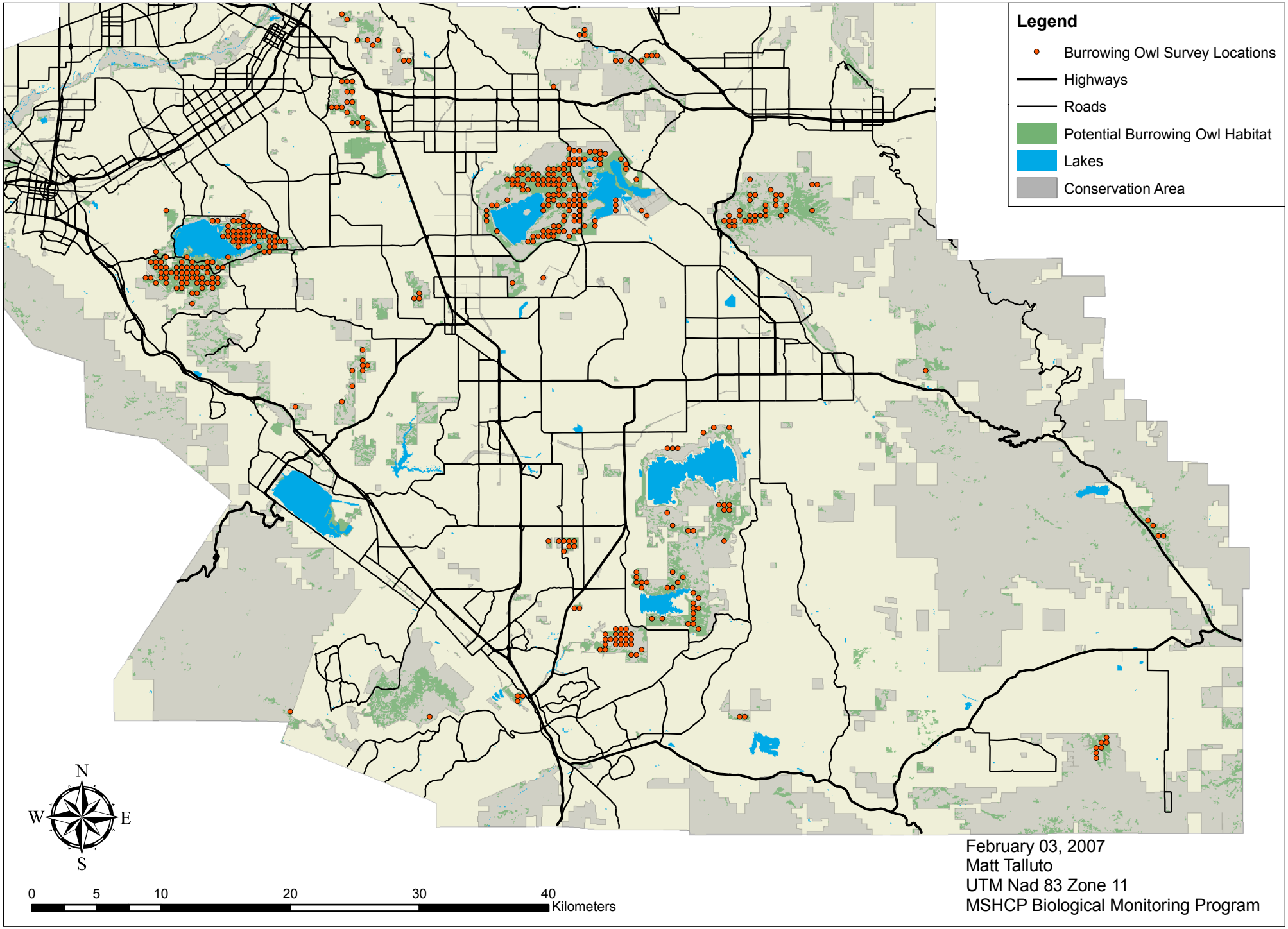


Figure 2: Burrowing Owl Observations: Johnson Ranch and Warm Springs

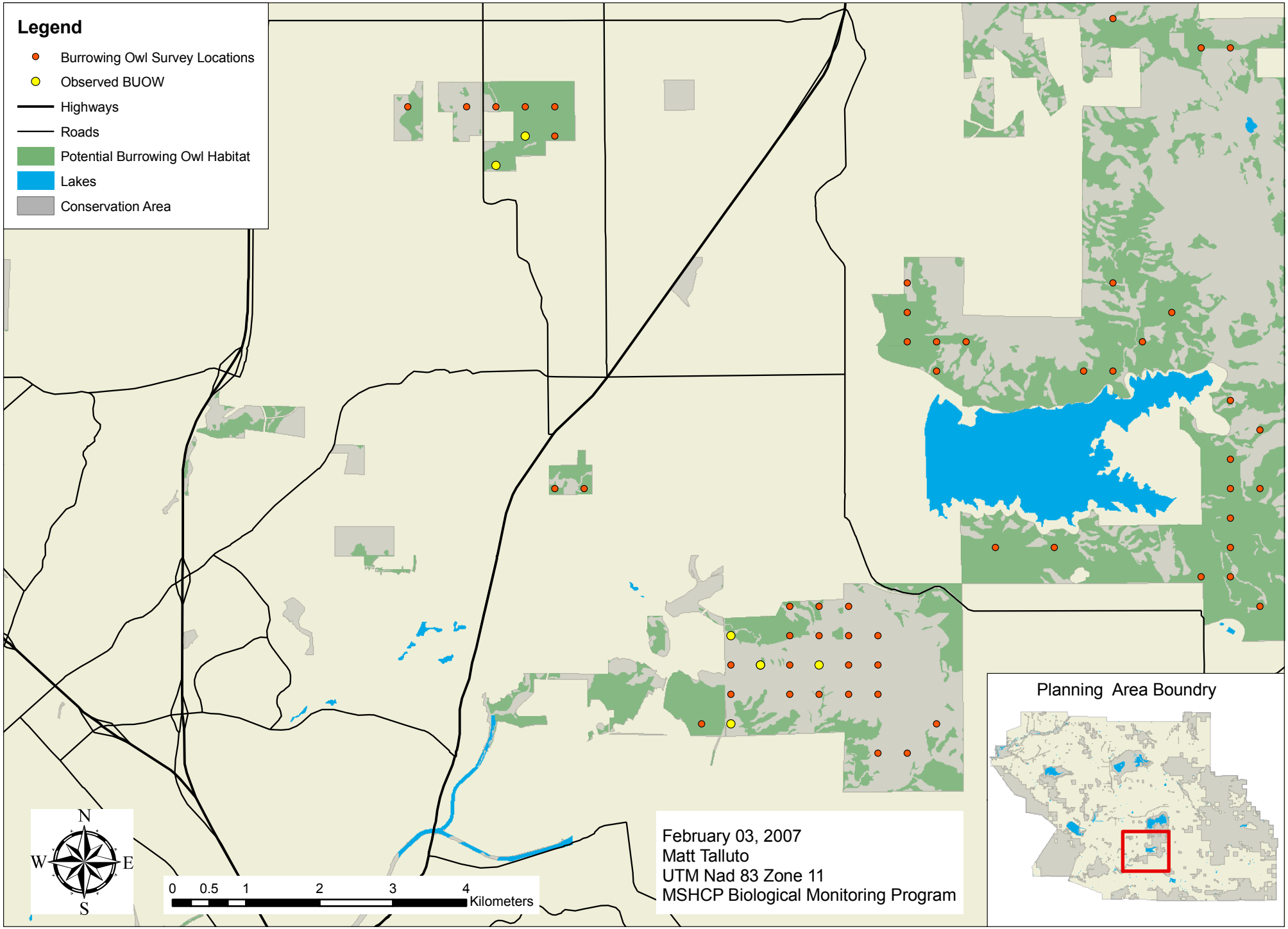
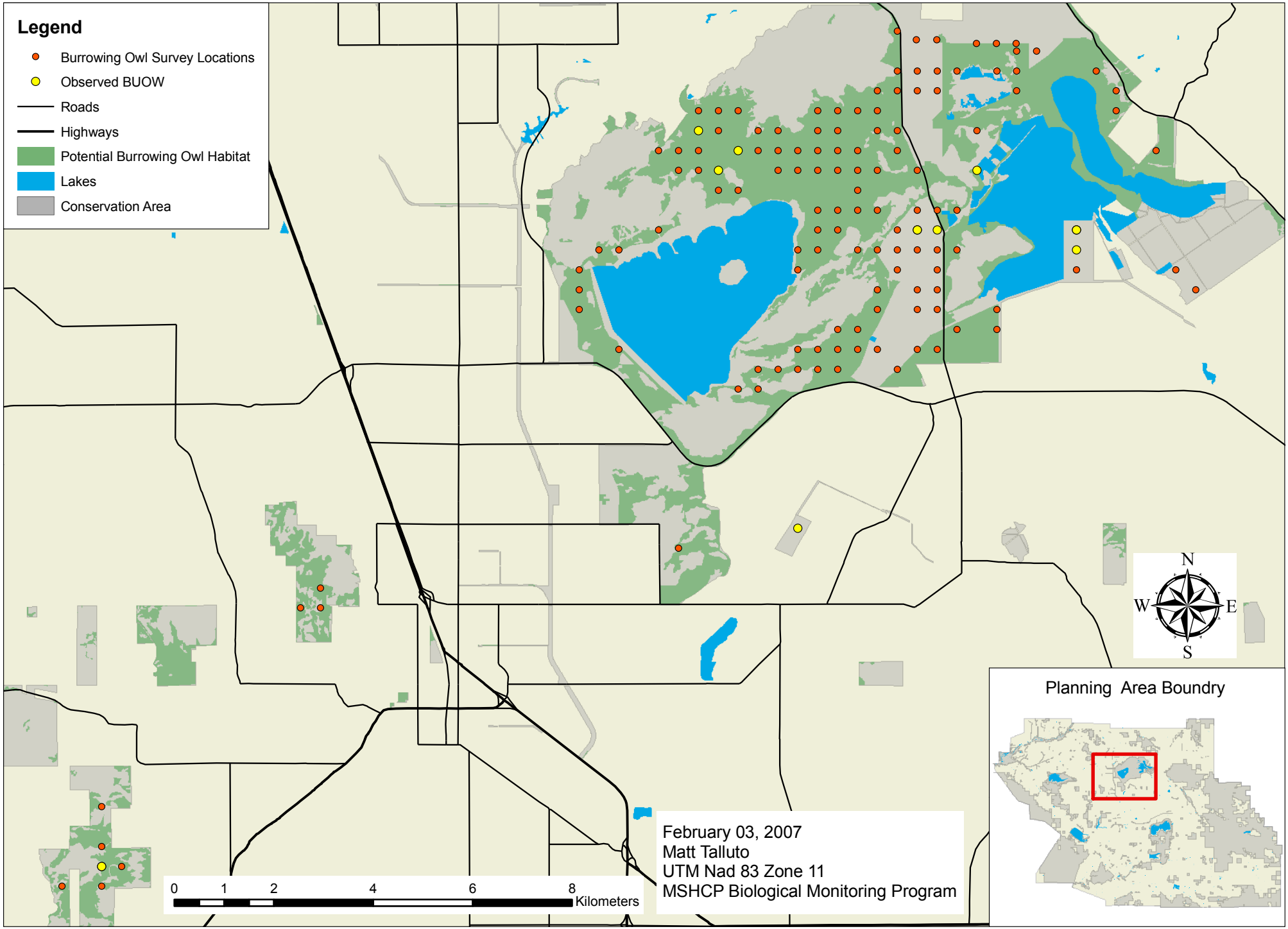


Figure 3: Burrowing Owl Observations: Lake Perris and San Jacinto Wildlife Area



APPENDIX A:

WESTERN RIVERSIDE COUNTY MSHCP SURVEYING PROTOCOL FOR THE BURROWING OWL (*ATHENE CUNICULARIA*) IN WESTERN RIVERSIDE COUNTY, CALIFORNIA

Goal: I. Determine the total number and location of breeding burrowing owls (BUOW) in primary and secondary suitable habitat in the Conservation Area, and confirm that there are at least 120 owls with no fewer than 5 pair in each of the 5 Core Areas identified in the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP).

Objectives: To achieve the above goal, presence/absence surveys will be conducted in suitable primary and secondary habitat within the Conservation Area along both walking and driving transects. To improve detectability at each survey, we will project pre-recorded BUOW calls. Wherever an owl is detected, a return visit will be made to census BUOW abundance in the area.

Timing: Surveys will be conducted three times during BUOW breeding season, once during each of the three following nest stages: breeding/laying/incubation (April 1 – May 9), incubation/feeding nestlings (May 20 – June 27), and fledging (July 8 – August 15).

Survey Locations: Survey stations will be placed 400 m (0.25 miles) apart within the MSHCP land conservation area within suitable habitat for BUOW nesting. *At least* one survey station will be placed within each BUOW Core Area and that is specified by the MSHCP The number of points placed in each Core Area will depend on the number of acres of suitable habitat available for survey.

A GIS layer will be created to identify suitable habitat using vegetation density and type. The suitable habitat will then be gridded into 400 m sections. Survey stations will be located at the intersection of the gridlines. We will visit all possible stations during each of the three survey periods. Observers will generally walk between stations. Any BUOWs detected between stations will be recorded.

The exact location of survey stations will be adjusted in order to ensure a good view of the surrounding area (i.e. at the top of a hill, or in a clear spot where there is no obstruction by vegetation). No permanent markers will placed in the ground unless an owl is observed.

Equipment for each technician:
Handheld GPS Unit
Eight (or more) spare fully-charged batteries
Thermometer (i.e. Kestrel)
Anemometer (i.e. Kestrel)
Data Sheets
Pencil for writing
Binoculars
Spotting Scope
CD player
Range Finder
2 Speakers
Hand-held compass
Avian Field Guide (e.g.. Sibley)
Incidental Forms and List
Clipboard
Day Pack
Sound Meter
Camera
CD with pre-recorded BUOW calls
Water, food and other personal needs
Plastic tent stakes
Digital watch or silent timer

Methods:

OVERVIEW:
Technicians will work independently, walking between survey points. Each technician will complete approximately ten survey points in a day under ideal conditions (i.e. weather, etc.). BUOW presence/absence surveys will be conducted as point counts at the center of a 200m radius circle using the variable circular-plot method. Each survey will last ten minutes. The first three minutes of the survey will be passive listening and looking for Burrowing Owls. The second three minutes will incorporate projection of BUOW calls while observing the landscape for BUOW. The last four minutes will be another period of passive observation for BUOW. When an owl is detected during a survey, its location will be recorded using a compass, rangefinder and GPS. After all surveys for each reserve area are completed, technicians in groups of two or more will revisit the locations where burrowing owls have been detected to determine the exact number of BUOW in the area (census).

I. VARIABLE CIRCULAR-PLOT METHOD: Describe the location of BUOW on suitable habitat within MSHCP covered land

Surveys will be conducted in daylight within 4 hours of dawn Surveys will commence approximately 0.5 hours before sunrise. Surveys will not be conducted when temperatures

exceed 32.2 degrees Celsius (90.0 degrees Fahrenheit), when wind speeds exceed 20 km/hr, or if it is raining, regardless of time of day, as owls will decrease their activity.

While the surveys are being conducted, including moving between points, the observer will take care to make as little noise as possible. All noise-making devices will be turned off. When driving on any portion of the conservation area, driving speed will not exceed 15 miles per hour.

Preparation before each survey day: Survey stations will be chosen and recorded in a handheld GPS unit for each surveyor. All necessary equipment will be packed into personal daypacks. Each of the CD players and speakers will be tested at the beginning of each day to ensure that they work and they are projecting at 84 dB (as measured at 1m distance from the speaker). Extra, fully-charged batteries will always be stowed in each technician's daypack. The speaker volume is to be checked again at least once during the survey day. This should not be done during a 10 minute point count period or at a point count location.

Preparation at each survey station: The observer will walk to each survey point guided by a handheld GPS. Once the way point is located, s/he will set up the spotting scope, the Kestrel, the playback devices and the personal timer. To prepare the recording device for usage in the second portion of the survey, the speakers will be turned to the highest volume possible and the CD player cued. The thermometer/ anemometer (i.e. Kestrel) will be turned on and positioned in the shade to collect wind and temperature data while the survey is being conducted. Each survey will be timed using a digital watch or equivalent silent timer.

Prepare two data sheets. On the "Burrowing Owl Variable-Circular Plot", record the reserve name, survey date, surveyor's name (initials are fine as long as they are unique from all other current field technicians), survey station number, and corresponding GPS coordinates (UTMs). Using a hand-held compass, or your GPS unit, orient yourself to north so that you can more accurately record BUOW locations. Prepare the "BUOW Data FORM" by recording reserve name, the date, surveyor's name, survey station number, and survey start time.

Conducting the survey: The ten-minute survey is to be conducted using a stopwatch or other personal timer. For the first 2 minutes, scan the 360 degree area around the point with binoculars and a spotting scope. Then play the tape for 30 seconds facing one of the cardinal directions. Then stand and look and listen for burrowing owls for 1 minute. Do this a total of four times, once in each cardinal direction. The observer should be watchful during this period because owls may respond to the tape with movement instead of vocalization. The play back period is to be followed with 2 more minutes of scanning the 360 degree area around the point.

If an owl is observed, a tent stake will be pushed into the ground at the center of the survey point.

Recording data during the survey: All owls seen and heard will be documented as distance and azimuth to the owls from the survey point. When an owl is seen, determine its distance from the survey point using the rangefinder and its azimuth from the survey point using a compass or your GPS unit. Take a waypoint to record your location. If the owl is only heard and not seen, make a

distance and direction estimate. Mark each individual bird's approximate location on the "BUOW Variable Circular PLOT" (the PLOT) and record the specific observation information on the "BUOW Data FORM" (the FORM). Other information to include on the FORM are whether a bird was detected visually or aurally (place an X in the appropriate box(es)), and the azimuth and distance from the survey point to the BUOW's location. Distance and bearing are only to be recorded when the owl is first observed.

Each bird will be given an individual code which will be used on both the PLOT and the FORM. This code is to assist in keeping the individual BUOWs discrete so that an accurate count can be made. The code is unique to each owl, it will consist of the observer's Monitoring Program initial and the consecutive number of owls observed by the observer. So, for example, the first owl observed by Karin Cleary-Rose would be C1, the fifth would be C5.

If juveniles or fledglings are observed, please record this information in the "Comments" column on the Form. Juveniles and fledges will get an individual code.

The comments column can be used to describe extra, non-essential information. It is more important to get a count of the BUOWs observed than to decide what they are doing. Therefore, any commentary outside of juvenile presence and count is considered of a secondary importance. However, it would be interesting to note whether juveniles are alone, what the group size is, and if a parents are present. If the observer sees a parent feeding any juveniles or carrying food at any point, this may be recorded as it might indicate an active and potentially successful nest. Other suitable information in the "Comments" column includes specific postures or behaviors of the BUOW observed. If the bird appears to be banded, and the number is easily observed, then this number can also be recorded in the "Comments" column.

After each survey station: At completion at each survey station, the temperature and wind velocity will be recorded only once per survey point on the FORM on the first observation line. Then the observer will pack up all gear and walk rapidly to the next survey point. The observer should be on the look out for BUOWs between survey stations.

After a survey day: Every day after collecting data in the field, return data sheets to the office and file them in the designated location. Bring all equipment to the building and do not leave anything in a vehicle. This will prevent your equipment from being driven off by another crew intent on accomplishing another activity. Additionally, return any uncharged batteries to the recycle bin or the recharge box, whichever is appropriate.

Inclement weather: Surveys will not be conducted during periods of excessive or abnormal heat (above 90F), wind over 20 km/h, rain or other inclement weather. Surveys cancelled due to bad weather will be rescheduled within the same survey window.

II. SPOT-MAPPING METHOD: Census the number of breeding pairs

When BUOW is found during a presence/absence survey, its approximate location will be recorded by taking a GPS location of the survey station centerpoint. An azimuth and distance from the survey station to the bird will be recorded on data sheets. To conduct a census of

BUOW located on MSHCP land, teams of two or more surveyors will return to the places where BUOW were identified during the initial survey.

To count BUOW, technicians will return during the same morning hours that the surveys were conducted. This starts half an hour before sunrise and continues for four hours after sunrise. Technicians will situate their view station at a vantage point at least 50 m from the known BUOW location in order to gain a broader view of BUOW activity. The reason for this is to avoid interrupting BUOW activity or destroying any nesting habitat Technicians will spend a minimum of thirty minutes at this vantage point. If a count consensus is confidently achieved in the thirty minutes, then no further effort is needed during this sampling period.

If after ten minutes of silent observation using binoculars and spotting scope no BUOW are detected, the use of playback devices may be used to illicit a response. However, this is not recommended. Playback will be used at a minimum during the census period.

If a consensus among technicians is not reached after half an hour of observation, technicians must return another day and observe from a distance as before until consensus between technicians is achieved.

The census count will be repeated during each sampling period in order to gain understanding of detectability changes that might occur between nesting stages. At each census, each surveyor will conduct an independent count of BUOW. The surveyors must reach a consensus regarding the number of BUOWs observed or return on a different day, and repeat until consensus is achieved.

Qualifications or Necessary Training for Technicians:

Surveyors and crew leaders must be able to distinguish between an adult and a juvenile Burrowing Owl using plumage characteristics. They must be familiar with BUOW vocalizations and be able to recognize them from at least 200 m (0.25 miles). Technicians will also be fully capable of independently operating binoculars, spotting scopes, CD players, speakers, GPS handheld units, and all other required equipment. Each observer will also be capable of determining the difference between the burrows of a Burrowing Owl burrow and other burrowing species. Training will be provided, prior to the field season.

Data Sheets: The data sheets are located in a file at this location: Z:\Staff\Kim\Burrowing Owl\Data Sheets and they are titled “BUOW Data FORM.doc” and “BUOW Variable Circular PLOT.doc”.

Completed data forms are to be stored at 4500 Glenwood Drive, Building C, Riverside, California 92501. They will be located in a filing cabinet across from a door to the Conference Room (aka Bird and Plant People Room). The drawer is the second to the bottom and is labeled, “Burrowing Owl Survey”.